CLAIMS:

1. A pipe segment (22) for transporting a hot particulate material, such as hot iron ore fines, in a carrier gas in a transfer line, which pipe segment (22) includes:

(a) an outer pipe section (2);

(b) an inner pipe section (4) defining a passageway (6) for a hot particulate material and a carrier gas, the inner pipe section (4) being positioned within the outer pipe section (2), and the inner pipe section (4) being formed from or having an inner lining of an abrasion resistant material; and

(c) a support means supporting the inner pipe section (4) in relation to the outer pipe section (2) so that the inner pipe section (4) can expand axially relative to the outer pipe section (2) in response to temperature changes in the material being transported in the pipe segment (22), the support means including a first support means located at one end of the pipe segment (22), the first support means including a support member that can receive an end of an inner pipe section (4a) of an adjacent pipe segment (22a) when the adjacent pipe segment (22a) is positioned in use in end to end relationship with the said pipe segment (22) and can allow axial expansion of that inner pipe section (4a) relative to the outer pipe section of the said adjacent pipe segment (22a) in response to temperature changes in the material being transported in the said adjacent pipe segment (22a).

2. A pipe segment according to claim 1, **characterized in** that the support member encloses and extends axially from one end of the inner pipe section (4) of the said pipe segment (22) and can receive and enclose the end of the inner pipe section (4a) of the adjacent pipe segment (22a) when the said adjacent pipe segment (22a) is positioned in use in end to end relationship with the said pipe segment (22) and can allow axial expansion of at least that inner pipe section (4) while the ends remain enclosed within the support member.

3. A pipe segment according to claim 1 or 2, **characterized in** that the support member forms a seal with the ends of the inner pipe sections (4, 4a) of the said pipe segment (22) and the said adjacent pipe segment (22a).

4. A pipe segment according to any of the preceding claims, **characterized in** that the support member includes an inwardly facing cylindrical surface for contacting the outer surfaces of the ends of the inner pipe sections (4, 4a) of the said pipe segment (22) and the said adjacent pipe segment (22a).

5. A pipe segment according to any of the preceding claims, **characterized in** that the support member is in the form of a sleeve (8) having the inwardly facing cylindrical surface.

6. A pipe segment according to any of the preceding claims, **characterized in** that the support member is directly connected only to the outer pipe section (2) of the said pipe segment (22).

7. A pipe segment according to any of claims 1 to 5, **characterized in** that the support member is directly connected to both the outer pipe section (2) and the inner pipe section (4) so that the end of the inner pipe section (4), but not the remainder of the inner pipe section (4), is constrained from axial expansion relative to the outer pipe section at that end of the pipe segment (22).

8. A pipe segment according to any of the preceding claims, **characterized in** that the first support means also supports the inner pipe section (4) in relation to the outer pipe section (2).

9. A pipe segment according to any of the preceding claims, **characterized in** that the first support means defines a barrier to movement of gas axially along the space between the inner and outer pipe sections (4, 2) of the pipe segment (22).

10. A pipe segment according to claim 9, **characterized in** that the first support means includes a frusto-conical barrier member (10) having a larger diameter end that is welded or otherwise connected to the outer pipe section (2) of the said pipe segment (22) and a smaller diameter end that is welded or otherwise connected to the support member.

11. A pipe segment according to claim 10, **characterized in** that the frusto-conical barrier member (10) is arranged so that the larger diameter end is located at the end of the outer pipe section (2) and the smaller diameter end is located inwardly of the end of the inner pipe segment (4).

12. A pipe segment according to any of the preceding claims, **characterized in** that the support means includes a second support means positioned at a location along the length of the pipe segment (22) between the ends of the pipe segment (22) and it supports the inner pipe section (4) in relation to the outer pipe section (4) for axial expansion relative to the outer pipe section (2).

13. A pipe segment according to claim 12, **characterized in** that the second support means also supports the inner pipe section (4) in relation to the outer pipe section (2) so that the inner pipe section (4) can expand radially relative to the

outer pipe section (2).

14. A pipe segment according to claim 12 or 13, **characterized in** that the second support means is welded or otherwise connected to the outer pipe section (2) and the inner pipe section (4).

15. A pipe segment according to claim 12 or 13, **characterized in** that the second support means is welded or otherwise connected to the outer pipe section (2) only.

16. A pipe segment according to claim 12 or 13, **characterized in** that the second support means is welded or otherwise connected to the inner pipe section (4) only.

17. A pipe segment according to any of claims 12 to 16, **characterized in** that the second support means functions as a spring that provides a resistance to radial expansion of the inner pipe section relative to the outer pipe section.

18. A pipe segment according to any of claims 12 to 17, **characterized in** that the second support means is in the form of a plurality of rods (14), each of which is bent so as to function as a spring, that are positioned at spaced intervals around the circumference of the inner and outer pipe sections (4, 2) at a location along the length of the pipe segment (22).

19. A pipe segment according to any of the preceding claims, **characterized in** that the abrasion resistant material of the inner pipe section (4) is a cast iron.

20. A pipe segment according to claim 19, **characterized in** that the inner pipe section (4) is made of an wear-resistant and/or abrasion resistant material, e.g. cast iron.

21. A pipe segment according to any of the preceding claims, **characterized in** that the outer pipe section (2) is formed from a steel.

22. A pipe segment according to any of the preceding claims, **characterized in** that the pipe segment (22) further includes thermal insulation (36, 38, 42, 46) in the space between the inner and outer pipe sections (4, 2).

23. A transfer line for transporting hot particulate material, such as iron ore fines, in a carrier gas, which transfer line includes a plurality of pipe segments (22) according to any of claims 1 to 22.

24. A transfer line according to claim 23, **characterized in** that the pipe segments (22) are positioned in end to end relationship with the ends of adjacent outer pipe sections (22a) welded or otherwise connected together, and the end of one of each pair of adjacent inner pipe sections (4, 4a) extending into and engaging the support member of the other of the pair of adjacent inner pipe sections (4, 4a).

25. A process for transporting hot particulate material in a carrier gas in a direct smelting plant for producing molten metal from a metalliferous feed material, in particular between a pretreatment unit and solid delivery means in the form of lances for injecting the material into a direct smelting vessel, **characterized in** that the material is transported in at least one transfer line according to claim 23 or 24.

26. A process according to claim 25, **characterized in** that the particulate material is iron ore fines with a reduction grade between 0 and 100% and preferably a reduction grade between 8 and 95%.

27. A process according to claim 25 or 26, **characterized in** that the particu-

late material is at a temperature between 200 and 850°C and preferably between 300 and 850°C.

28. A process according to any of claims 25 to 27, **characterized in** that the carrier gas is at least substantially N_2.

29. A process according to any of claims 25 to 28, **characterized in** that the hot ore fines are transported along the transfer line at a minimum velocity of at least 19 m/s by the carrier gas, and are injected into a direct smelting vessel with the carrier gas having a lance tip velocity in the range of 70 – 120 m/s.